SQUIRE SANDERS

Squire Sanders (US) LLP
1200 19th Street, NW
Suite 300
Washington, DC 20036

O +1 202 626 6600
F +1 202 626 6780
squiresanders.com

Bruce A. Olcott
T +1 202 626 6615
bruce.olcott@squiresanders.com

January 27, 2012

VIA ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: Progeny LMS, LLC
Permitted Oral Ex Parte Presentation
WT Docket No. 11-49

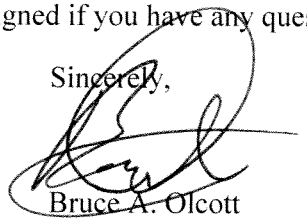
Dear Ms. Dortch:

On January 25, 2012, representatives of Progeny LMS, LLC ("Progeny") met with representatives of the Commission staff to discuss the results of testing conducted to demonstrate Progeny's compliance with Section 90.353(d) of the Commission's rules. Participating in the meeting on behalf of the Commission staff were Julius Knapp, Geraldine Matise, Mark Settle, Karen Ansari, and Hugh Van Tuyl of the Office of Engineering and Technology, and James Schlichting, Paul Murray, Tom Peters, Paul D'Ari, Ziad Sleem, Thomas Derenge, Bill Stafford, and Thuy Tran of the Wireless Telecommunications Bureau. Participating in the meeting on behalf of Progeny were Gary Parsons, Ganesh Pattabiraman, Ron Olexa and the undersigned.

During the meeting, the Progeny representatives described the testing process that was conducted to demonstrate that the Multilateration Location and Monitoring Service ("M-LMS") network that Progeny and its affiliate companies are planning to operate in its licensed M-LMS spectrum does not cause unacceptable levels of interference to Part 15 devices. The substance of the discussion tracked closely with the attached PowerPoint presentation that was distributed during the meeting. The discussion also focused on elements of the Part 15 test report that was prepared for Progeny by an independent third party testing firm, Spectrum Management Consulting Inc. A copy of that report has been filed on this date under separate cover in the above captioned docket.

Please contact the undersigned if you have any questions.

Sincerely,



Bruce A. Olcott
Counsel to Progeny LMS, LLC

Progeny LMS, LLC

Coexistence of M-LMS and Part 15 Devices

January 25, 2012

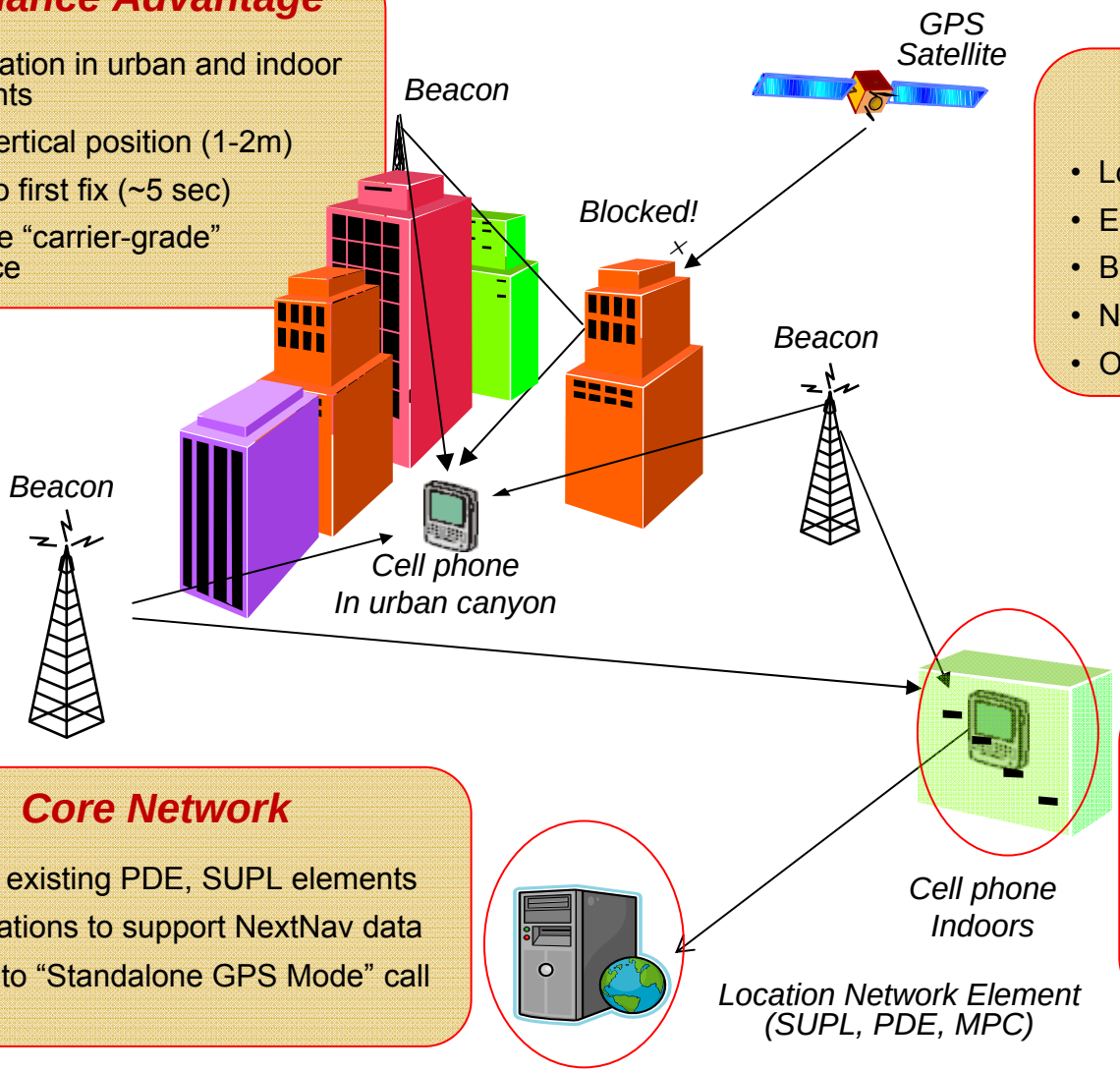
Background

- Progeny LMS, LLC ("Progeny") is an M-LMS B and C-block (919.75-927.75 MHz) licensee
- NextNav (formerly Commlabs) is constructing a *Wide Area Positioning System* ("*WAPS*") in Progeny's spectrum to provide high-precision location service
- Before commercial service can begin, M-LMS licensees must "demonstrate through actual field tests that their systems do not cause unacceptable levels of interference to [Part 15] devices"
- Tests were conducted
  - By Spectrum Management Consulting, Inc. ("SMC")
  - Using NextNav's initial deployment in Santa Clara County, California
  - Under Commlabs' experimental license (call sign WF2XLW)

NextNav WAPS Network Elements

Performance Advantage

- Precise location in urban and indoor environments
- Accurate vertical position (1-2m)
- Fast time to first fix (~5 sec)
- Dependable “carrier-grade” performance



Broadcast Beacons

- Low-power, highly synchronized
- Encrypted signal
- Broad coverage from minimal sites
- No backhaul, small form factor
- Operate on licensed spectrum

Core Network

- Utilizes existing PDE, SUPL elements
- Modifications to support NextNav data
- Similar to “Standalone GPS Mode” call flows

Receivers

- Firmware upgrade to “typical” GPS chipsets
- Minimal handset integration cost
- On-device computation of location
- Reduced power consumption

WAPS Interference Mitigation Techniques

- **Broadcast Only**
  - No return path from ubiquitously deployed mobile devices
  - Enables high-site/low-density architecture increasing distance from Part 15 devices
  - No need for additional transmitters for capacity as the number of users increases
- **Low Data Rate**
  - Maximizes signal penetration with a minimum number of transmit beacons
- **20% Duty Cycle**
  - Intermittent transmissions allow Part 15 devices to continue to operate
  - Maximizes co-existence with Part 15 devices even when close to WAPS beacon

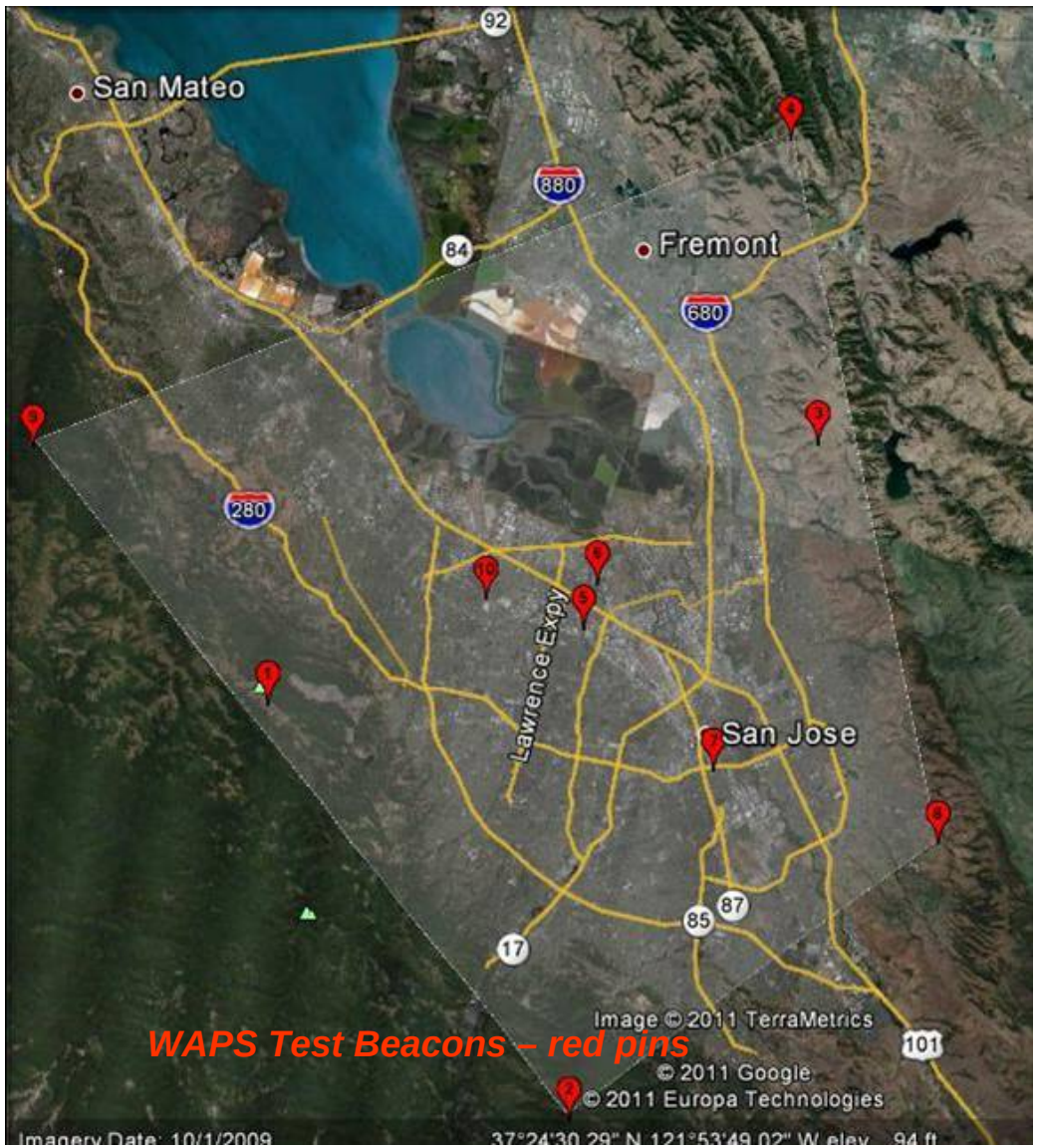
Questions Addressed in Part 15 Tests

1. Determine whether WAPS network would impact operation of a variety of Part 15 devices, and if so
    - Under what conditions
    - The type of impact and impairment that occurred and
    - Whether different device types were impacted differently
2. Evaluate effectiveness of our mitigation techniques in avoiding unacceptable interference to Part 15 devices
3. Evaluate how operating characteristics of Part 15 devices can mitigate or eliminate potential WAPS impact
    - For example, some Part 15 devices automatically sense interference and re-tune to a different channel

Summary of Findings

- Most Part 15 devices, when used in a typical manner, will never experience interference from WAPS
  - They will switch to a non-WAPS channel when a WAPS signal is detected (either automatically or through user selection)
  - They will only rarely simultaneously occupy the same frequency as a WAPS signal due to frequency hopping or other technology
  - Even when a WAPS beacon is co-frequency, the WAPS signal will usually be overpowered by the more proximate Part 15 transmitter
- In all cases in which a Part 15 receiver did detect a WAPS signal and remained on the same channel:
  - The receiver continued to operate, transmitting and receiving its desired signal

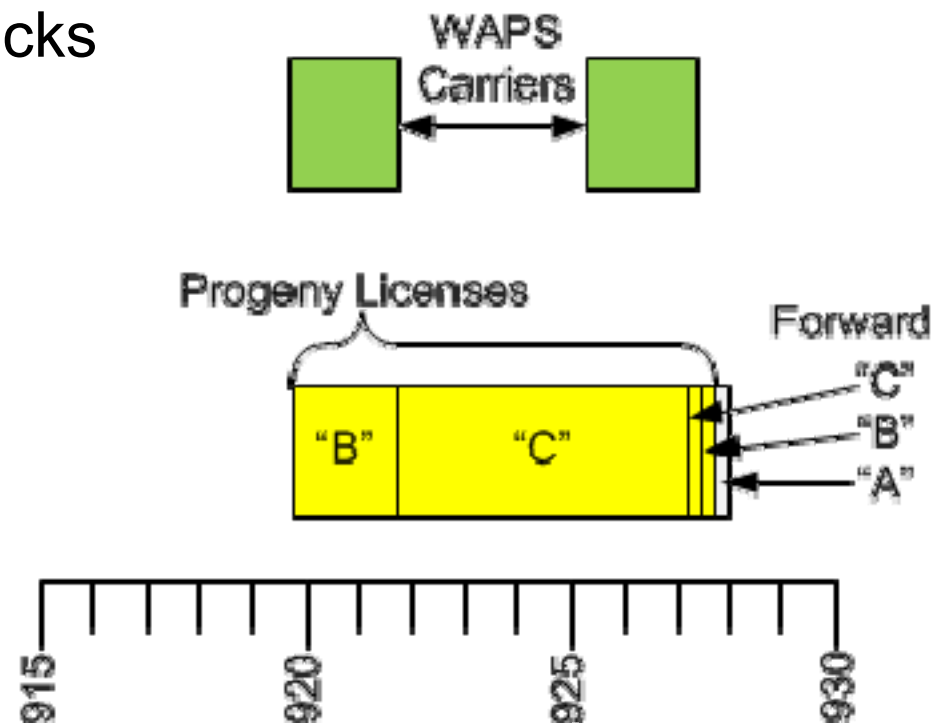
WAPS Network Used For Testing



- Located in Santa Clara County, California
- 6 beacons on hilltops surrounding the valley
- 4 beacons on tall buildings on the valley floor

Beacon and Test Network Properties

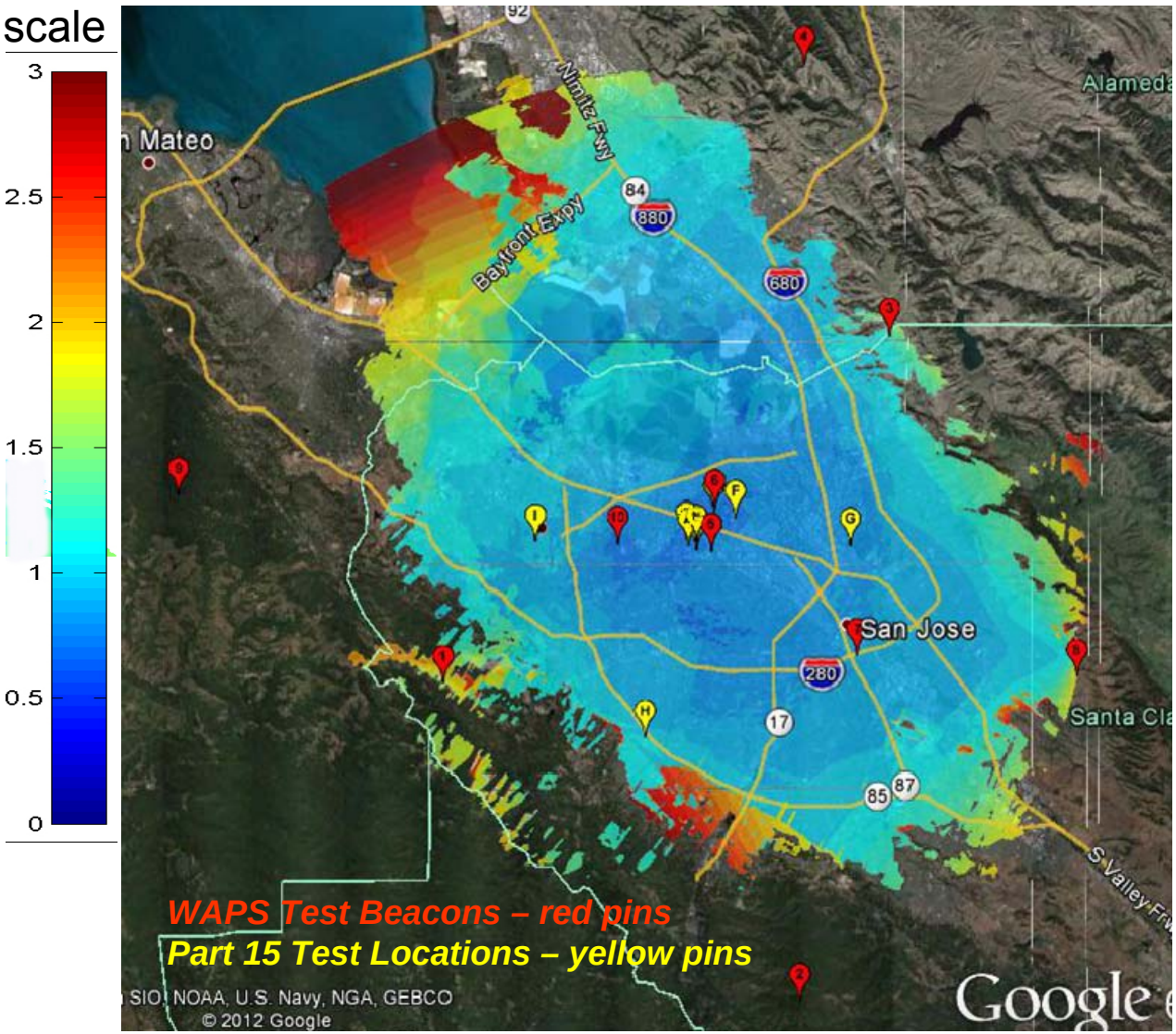
- Same design as for commercial deployment
  - Transmitter ERP of 30 W per carrier
  - 2.046 MHz bandwidth at upper and lower ends of B and C blocks
  - Beacons operate at up to 20% duty cycle



Part 15 Test Locations

- Nine test sites chosen
  - Full WAPS coverage
  - Representative of normal use
- One additional site colocated with a WAPS beacon as “break case”
- Some sites used for multiple test scenarios
  - E.g., a house with one path from kitchen to bedroom and another from kitchen to patio

WAPS Service Area Calculation



- Calculate geometric dilution of precision ("GDOP") from four or more beacons
- Beacons are projected to have sufficient signal strength to provide service in suburban buildings and vehicles
- All test locations had a GDOP of less than two, providing sufficient coverage for a reliable and accurate fix

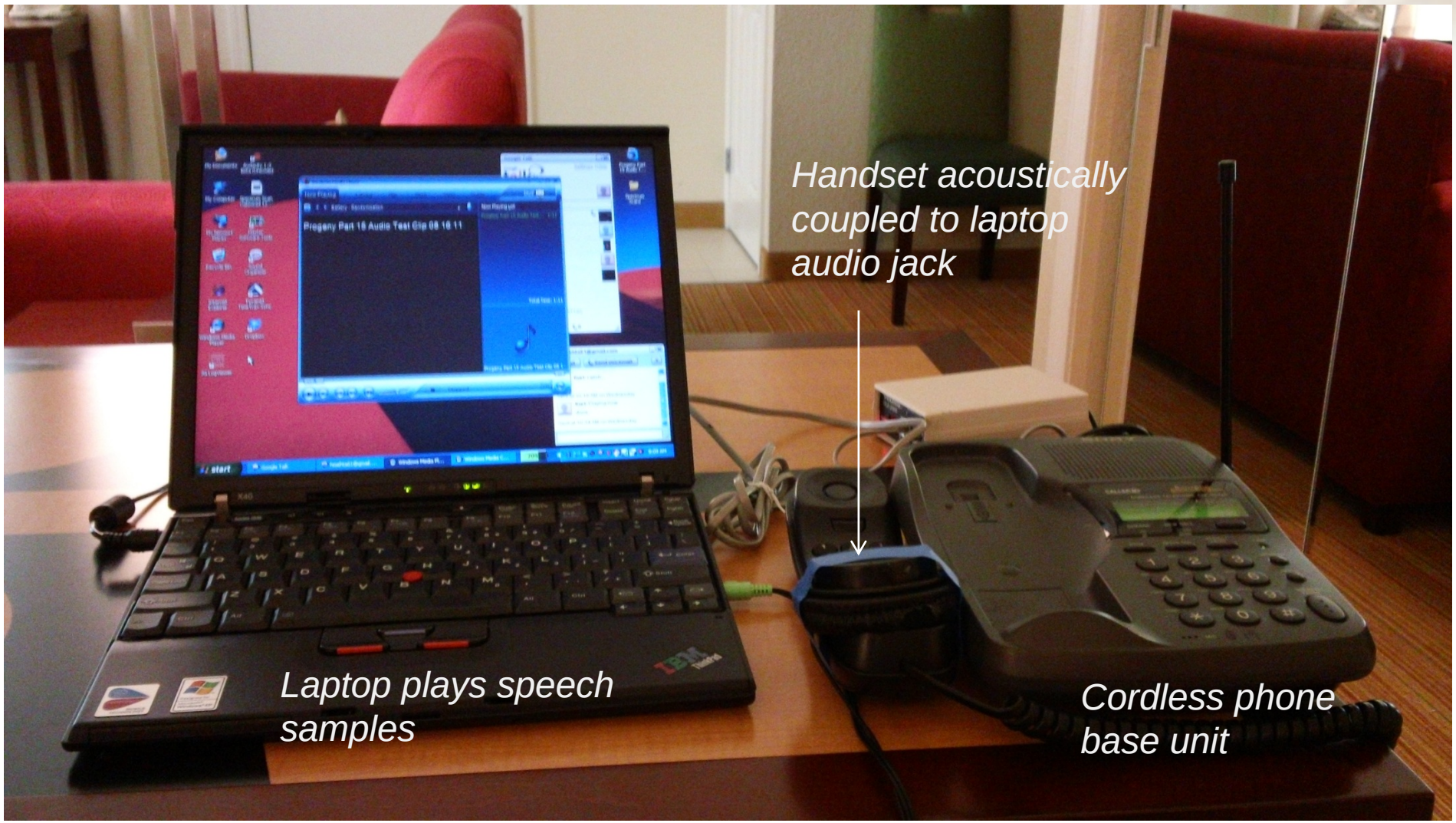
Part 15 Test Locations

Location	Description	Construction	Device Categories Tested	Distance to Nearest Beacon (mi)
A	Office Suites	Reinforced concrete with atrium	Consumer, Commercial, Industrial	0.8
B	Commercial Office Building	Tilt-up	Commercial, Industrial	0.5
C	Apartments	Wood frame construction with stucco exterior	Consumer	0.9
D	High-rise Hotel	Reinforced concrete	Consumer	0.0
E	Garden Hotel	Wood frame construction	Consumer	0.6
F	Single Family Home	Wood frame construction with stucco exterior	Consumer	0.8
G	Multistory Condominium	Wood frame construction with stucco exterior	Consumer	3.7
H	Single Family Home	Wood frame construction with stucco exterior	Consumer	6.5
I	Single Family Home	Wood frame construction	Consumer	2.8
J	High-rise Hotel	Reinforced concrete with glass exterior	Consumer	0.2

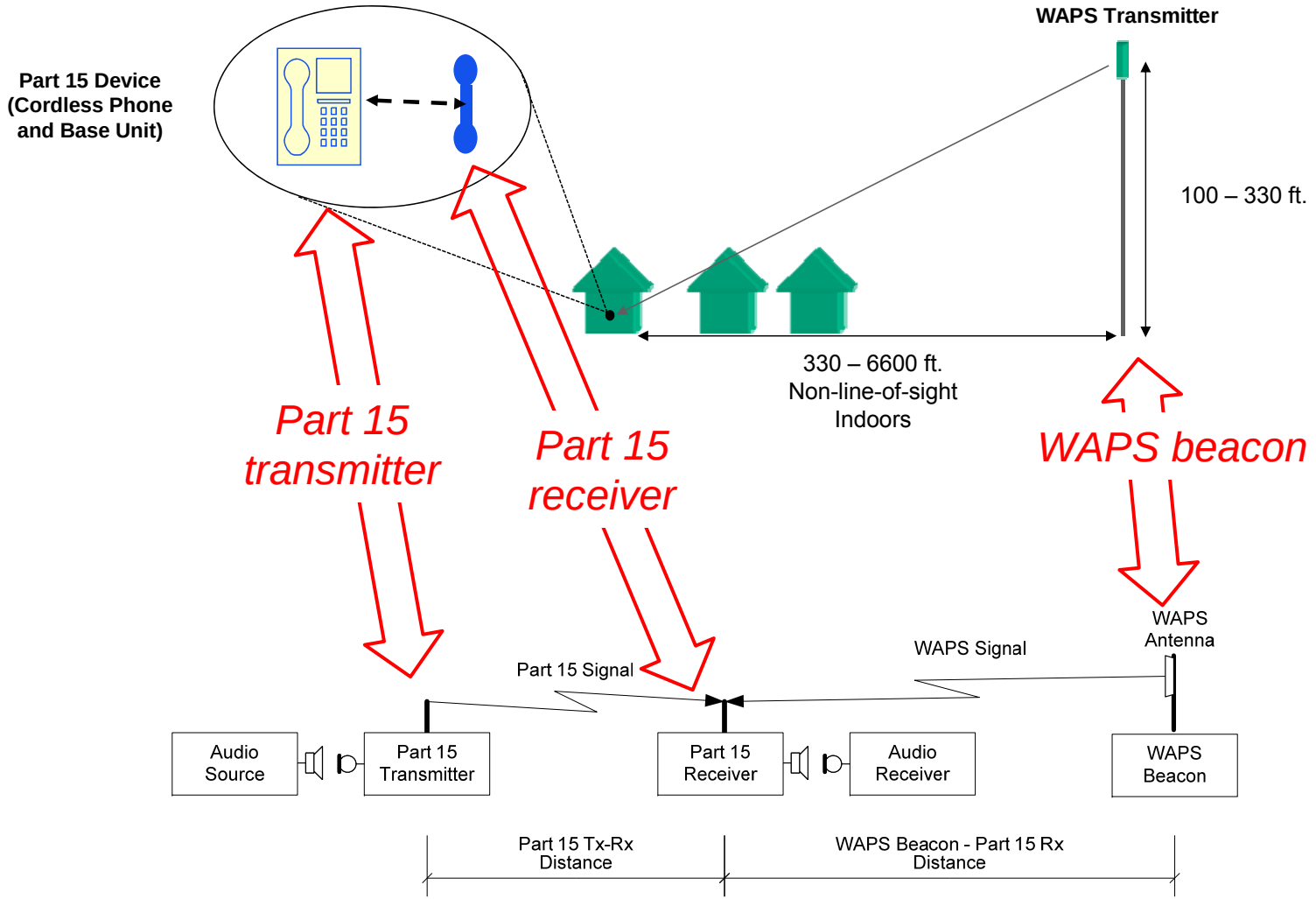
Part 15 Devices Used In Field Tests

Device Number	Category	Device Description	FCC ID	Lowest Frequency (MHz)	Highest Frequency (MHz)	Number of channels	Channel Selection	Modulation
1	Consumer	Audio/Video Baby Monitor	PZK201AT	910	921	2	Manual	Analog FM
2	Consumer	Baby Monitor + Walkie Talkie	EHK900646RTRIA	925.2	926	2	Manual	Analog FM
3	Consumer	Baby Monitor	M6YA3929A3930	909.524	919.764	6	Manual	DSS digital modulation
4	Consumer	Cordless Phone	AK8SPPSS965	904.018	927.133	20	Automatic	DSSS
5	Consumer	Cordless Phone	AESUC226	925.610677	927.698745	20	Manual	Analog FM
6	Consumer	Cordless Phone	OG993	924.928	927.36	20	Manual	Analog FM
7	Consumer	Audio/Video Baby Monitor	MNJ08020T	908.5	927.5	2	Manual	Analog FM (audio)
8	Consumer	Wireless Headphones	DMORS03ABUS	926	928	3	Manual	Analog FM (stereo)
9	Consumer	Wireless Outdoor Speaker	S6LB-BROOKSTONE	925.8	927.4	3	Manual	Analog FM
10	Consumer	Wireless Telephone Pendant	TYD30911/ELG30911	925.3	927.2	20	Not Selectable	Analog FM
11	Commercial	Universal Remote Control	P4U-MNTA2	902	928	65	Automatic	FHSS
12	Consumer	PTT Radio/Wallkie-Talkie	IHDP56HJ1	902.575	927.475	500	Automatic	FHSS – 8FSK
14	Consumer	Cordless Phone	AK8SPPSS965	902	928	20	Automatic	DSSS
15	Industrial	RFID Handheld Reader	PJMMRU200	902	928	50	Automatic	FHSS
16	Industrial	Long Range RFID Reader	H9PMC906RC	902	928	50	Automatic	FHSS
17	Utility	AMR Meter System	NTAXMETER30	905.43	923.55	6	Automatic	DTS
18	Commercial	Broadband Wireless System	ABZ89FC5809	902	928	3	Manual	Digital

Typical Test Setup – Consumer Device



Correspondence Between Interference Model and Test Setup



Basic Test Approach

1. Operate WAPS network in a manner representative of commercial deployment in terms of RF design, power, duty cycle and other operating characteristics
2. Collect sample of Part 15 devices representative of those in market
3. Identify test locations within WAPS network coverage area that are representative of typical use cases for Part 15 devices
4. Test performance of each device at each location, once with WAPS network OFF and again with it ON
   - For devices that can tune to multiple channels, test both off-channel (typical use) and on-channel (atypical use) performance
5. Compare the results

“Break Case” Test Approach

1. In addition to testing under normal or typical use cases, establish a “break case” environment

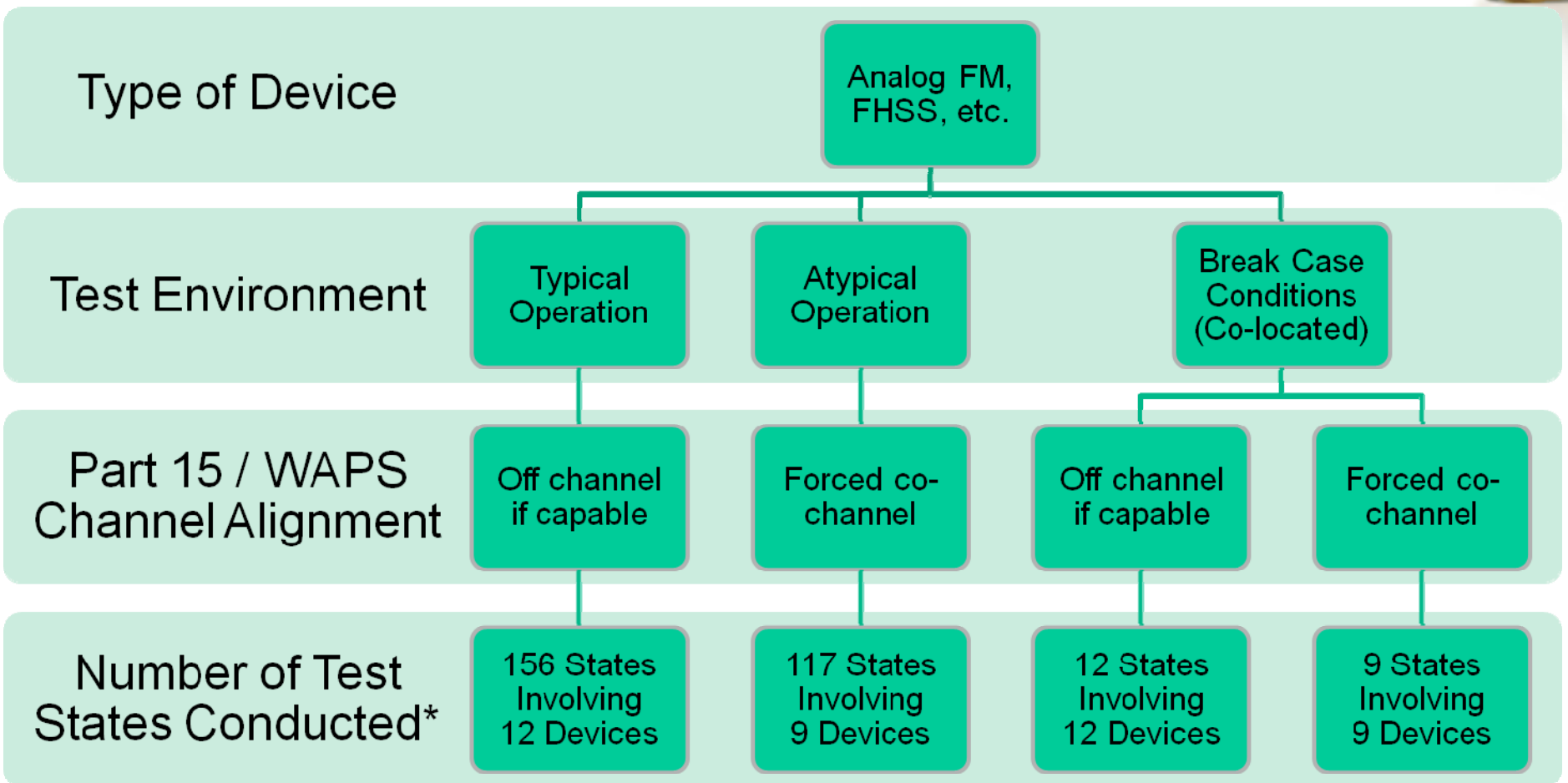
2. This environment involved:

   – Testing Part 15 devices within 50 feet of a WAPS beacon and

   – Intentionally setting devices to be co-channel with beacons

3. Some devices, however, could not be forced to operate in a co-channel mode

Part 15 Consumer Device Test Process



* A test *State* is one device tested at one location and path. Some locations had several paths. For example, if 12 devices were tested at 13 locations/paths then there are 12 × 13 = 156 states.

Part 15 Consumer Device Test Results

In all cases, Part 15 devices continued to operate, transmitting and receiving desired signals

Typical: Off-channel if capable	No device detected WAPS beacon while operating off channel – One FM device could only operate co-channel, detecting a beacon in two locations (2 test states out of a total of 156 test states)
Atypical: Forced co-channel	Co-channel WAPS beacon was detected in 27 of 117 test states – 18 of the 27 detections involved 2 of the 9 devices
Break Case: Co-Located & Off-channel	Majority of devices (7 out of 12) could not detect co-located beacon
Break Case: Co-Located & Co-channel	Although 7 out of 9 devices detected co-located beacon (2 could not detect the beacon), all devices continued to operate

Commercial/Industrial Test Results

- Four devices tested in six configurations (24 test states)
- No material differences between WAPS beacon ON or OFF
- Observed differences caused by:
  - Orientation between RFID Tag and readers or with AMR or Wireless Remote
  - Variations in path measurements caused by measurement wheel used over large distances (slight swerving going over sidewalks and roads)

Test Location A	System Off			System On		
	Test Case 1	Test Case 2	Test Case 3	Test Case 1	Test Case 2	Test Case 3
AMR Meter System	354.3	997.0	658.0	354.0	982.0	661.0
Universal Remote Control	78.0	201.0	89.0	81.0	201.0	80.0
Long Range RFID Reader	21.0	18.3	3.0	22.0	19.0	2.8
Handheld RFID Reader	21.5	17.0	8.0	23	18.0	8.0

Test Location B	System Off			System On		
	Test Case 1	Test Case 2	Test Case 3	Test Case 1	Test Case 2	Test Case 3
AMR Meter System	447.0	369.0	747.7	467.0	376.0	747.7
Universal Remote Control	317.0	189.0	291.0	298.0	180.0	294.0
Long Range RFID Reader	20.0	19.7	3.7	20.0	19.7	3.4
Handheld RFID Reader	60.0	36.0	7.5	60.0	36.0	7.5

Broadband Wireless Access System

Test System Configuration

- Chosen system characteristics:
  - Operates much like WiFi: one access point (AP) and multiple subscriber units (SUs)
  - Designed for professional installation

Key Test Procedures

- Measure link throughput using iPerf with WAPS network ON and OFF
- Tested at 906 and 920 MHz:
  - 906 MHz – off channel
  - 920 MHz selected because it has most overlap with WAPS
- Test link:
  - AP mounted on roof of building
  - SUs ~0.4 miles away
  - Non LOS path
  - Closest WAPS beacon ~0.4 miles away from SUs

Broadband Wireless Throughput

- No material differences between WAPS beacon ON or OFF

Average Measured Throughput (kbps)					
			Throughput Test Rate (kbps)		
WAPS Status	**Location**	**MHz**	**500**	**750**	**1,000**
OFF	1	906	500.00	750.55	1,000.45
ON	1	906	500.00	749.95	1,000.35
Percent throughput reduction with WAPS ON			0.0%	<0.08%	<0.01%
OFF	1	920	500.00	746.75	999.80
ON	1	920	499.90	749.95	940.15
Percent throughput reduction with WAPS ON			0.02%	0.0%	5.97%
OFF	2	906	500.00	750.50	1,000.35
ON	2	906	500.00	750.50	999.85
Percent throughput reduction with WAPS ON			0.0%	0.0%	<0.05%
OFF	2	920	500.00	749.90	1,000.40
ON	2	920	500.00	750.50	997.35
Percent throughput reduction with WAPS ON			0.0%	0.0%	0.3%

In Conclusion

- WAPS position location service does not cause unacceptable interference to Part 15 devices
- WAPS employs significant interference mitigation techniques greatly reducing potential for interference
  - Broadcast-only
  - High-site/low-density architecture
  - 20 percent maximum duty cycle
- Almost no Part 15 devices can detect a WAPS beacon when used in a normal or typical manner
- Even when WAPS detected, all devices continue to operate, transmitting and receiving desired signal